

NORTHERN TERRITORY BOARD OF STUDIES RESPONSE TO ACARA ON THE ENGLISH, MATHEMATICS, SCIENCE AND HISTORY SENIOR SECONDARY CURRICULUM

1. NORTHERN TERRITORY CONTEXT

1.1 SCHOOLS AND SCHOOL STRUCTURE

Schools in the Northern Territory (NT) are organised by stages of schooling. The primary years cater for students from Transition to Year 6. Students begin Transition (equivalent to Foundation) at a minimum of 4.6 years of age. The middle years of schooling cater for students in Years 7-9 and the senior years for students in Years 10-12. In Darwin and Alice Springs, dedicated middle schools and senior colleges exist, while in other NT locations comprehensive high schools cater for students from Years 7-12. In remote locations, community schools cater for students from Transition through to Year 12. Approximately 40 per cent of NT students have a language background other than English.

Year 10 is seen as the beginning of the senior secondary certificate with all students undertaking the Personal Learning Plan (PLP), a compulsory subject towards the Northern Territory Certificate of Education and Training. Many students also take advantage of the flexible nature of the certificate by undertaking Stage 1 (Year 11) subjects while in Year 10.

The following table indicates the number of students enrolled in the senior years in 2012.

Year level	Enrolments
10	2541
11	2710
12	1837

1.2 NORTHERN TERRITORY BOARD OF STUDIES

The Northern Territory Board of Studies (NTBOS) is an independent authority that provides advice to the Minister for Education and Training and the Chief Executive of the Department of Education and Training.

The Board consists of a Chairperson and fifteen other members representing parents, employers, principals, teachers, post school educators, unions, the government and non-government schools sectors, Indigenous communities and the Department of Education and Training.

1.3 RELATIONSHIP WITH SOUTH AUSTRALIA

Students in the NT undertake the Northern Territory Certificate of Education and Training (NTCET). The NTCET is based upon the South Australian Certification of Education (SACE) which is administered by the SACE Board of South Australia.

While the curriculum and assessment used to deliver the NTCET is identical to what is offered in South Australia, there are some differences in completion requirements to attain the NTCET qualification. Students in the NT must achieve 140/200 units at a level of satisfactory achievement (C grade or better) to attain the certificate while in South Australia 110/200 units at a level of satisfactory achievement are required. The "Research Project" undertaken by all students in Stage 2 (Year 12) in South Australia, is not a compulsory requirement in the NT.

2. CONSULTATION PROCESS

Curriculum, Teaching and Phases of Learning division (CTPoL) NTCET consultants convened meetings during June 2012 inviting senior secondary teachers of English, mathematics, science and history from all sectors to provide feedback on the ACARA senior secondary subjects. For each subject group an average of four teachers were involved in providing feedback. The feedback from these meetings is detailed in Section 3.

For any subject specific queries relating to the feedback please contact the respective NTCET consultant.

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3. FEEDBACK

3.1 ENGLISH

Key strengths identified by all English subject groups

- The developed subjects were viewed positively by all groups.
- The subject names were felt to be generally appropriate.
- The four unit structure has internal logic and coherence.
- Units 3 and 4 are more cognitively demanding than Units 1 and 2.
- The rationale provides clarity about the subject's broad scope, distinctive nature and importance.
- The aims comprehensively describe the intended learning as a result of studying the subject.
- The four unit structure is clear and there is an obvious development and progression between units.
- There is a clear link between the senior secondary subjects and the F-10 Australian Curriculum.

Key issues identified by all English subject groups

- The achievement standards are not appropriate and need considerable redevelopment.

Specific Subject Feedback

Literature – Strengths

There was strong agreement with the following:

- The rationale relates well to the *Shaping Paper* 5.3.6 (2009).
- The assessment descriptors clearly follow Bloom's taxonomy.

There was agreement with the following:

- The majority of content descriptions for each of the units are appropriate. The exception was with Unit 4.
- The unit descriptions clearly describe the focus and scope of the units.

Literature – Issues

- In the aims, "a range of critical perspectives" needs to be defined. There are a number of possible interpretations. Other jurisdictions may have a different definition of this to the Northern Territory.
- The management of Unit 4 may be problematic to implement given that some jurisdictions spend three terms on Year 12 and others have four terms. Unit 4 may only be one term in length hence a comparability issue.
- The notion of students questioning themselves as readers in Unit 1 and how they position themselves as critical readers needs to be clearer.
- Questioning and learning about making assumptions needs a stronger emphasis in Unit 1.
- The unit outcomes describe clearly the expected learning for this unit however they are not necessarily represented in the achievement standards e.g. Unit 1 – "shape meaning", Unit 2 – "used in different texts".
- There needs to be something explicit about the way students use evidence.
- "Originality" is a difficult concept to assess.
- In Unit 4, "Synthesising a range of interpretations" caused some concern given the nature/content of the Northern Territory current senior year subjects. In the content descriptions – "Analyse and reflect on the relationships..." dot point two "the relationship between...", it was felt that the word "significant" was not needed as it could cause some problems in relation to the selection of the fictional texts studied. There is a heavy reliance on the interpretation of texts by others.

- With regard to the achievement standards:
 - The descriptors clearly follow Bloom's taxonomy however they need to be clearer to differentiate between each grade.
 - The move from grade to grade is sometimes too big a jump and at other times too small.
 - Models will be needed to help make the meaning of assessment descriptors clearer.
 - The continuum of dot points is not consistent throughout the grades.
 - It was felt that some of the descriptors for a C grade should be in the B grade and some D grade descriptors should be in the C grade band. If this subject is pitched too high the implications will be that very few students elect to do it. There has already been a decline in the number of students electing to undertake the literature equivalent subject in the Northern Territory and South Australia.
 - Performance at a particular level is not clearly distinguished. The addition of more verbs with each dot point is needed (e.g. students analyse and evaluate...).
 - The use of the words "aesthetic" and "interrogates" in the achievement standards for Units 3 and 4 caused problems for some panel members. The move between A and B was seen as being problematic.
 - In the achievement standards the addition of more verbs and adjectives needed.
- The glossary is not comprehensive.

Literature – Recommendations

- The achievement standards are the greatest concern in the draft document and need to be extensively rewritten.
- Models will be needed to help make the meaning/interpretation of the assessment descriptors clearer – i.e. the edited assessment descriptors.
- States and territories should have the option of completing Unit 4 in one term (i.e. twenty-five to thirty hours).
- The "interpretations of texts by others" needs clarification.

English – Strengths

- A good balance between the creative and analytical.
- See overall strengths for all English subjects.

English – Issues

- The interpretation of persuasion in the content descriptions in Unit 1 appears to include argument. The NT currently differentiates between the two terms.

- The term “hybrid tasks” in the content descriptions in Unit 2 needs a more detailed explanation. “The effect of the interplay between...” also needs to be explained.
- There is concern that there is too much emphasis on comparison in Unit 3. Positioning of the audience could also be added to the content descriptions.
- There was concern that there was too much content in each of Units 3 and 4 to be taught in 50-60 hours.
- Dot point 2 of the learning outcomes in Unit 4 generated a lot of debate. This is a new area for the NT. Can different interpretations be those that arise within the classroom or do they need to be from critics? There is a very strong emphasis on this whereas the current NT curriculum focuses more on students developing their own interpretations and not a using a “borrowed” interpretation. This needs to be clarified.
- There was disagreement with all questions concerning the achievement standards for all units. Specifically:
 - The creating standards in the Unit 1 and 2 achievement standards are better than the responding standards.
 - Dot point 3 in the creating column across grades needs to be worked upon. Dot point 4 in the responding column (interpretations) needs development.
 - In Unit 3 the emphasis is on comparison.
 - Achievement Standards Units 3 and 4 - “experiments” in the A section caused some concern – can be done at an A,B,C standard.

English – Recommendations

- Add the following to the glossary: “transform and adopt” to avoid confusion. Other additions or expansions of definitions are needed e.g. adopt/transform, interpretative, persuasive/argument, hybrid for example.
- The achievement standards are the greatest concern in the draft document and need to be extensively rewritten.

Essential - English Strengths

- The practical nature of the subject was viewed positively.
- There is an appropriate balance between text production and analysis. There would be concern if the analysis increased.
- See overall strengths for all English subjects.

Essential English – Issues

- Content descriptions:
 - There were some concerns expressed in relation to cognitive demands perhaps being segmented and there may be some gaps especially leading to what is required in Unit 4.

- Unit 4 - Definition of argument and persuasion needs to be clarified. The jump from Unit 1 to 4 is too large. Some content in this unit is not appropriate for the cohort – only a misplaced student is likely to achieve an A.
- Achievement Standards
 - The achievement standards need a lot of development. Much more descriptive language is needed. The dot points need to be consistent against all grade bands. There are concerns with most grade bands especially the extremities (i.e. A and E).
 - It was felt that to obtain an A as indicated in the achievement standards then the aims should be extended to include critically engaging with texts thus providing more scope for students to analyse, evaluate and synthesise.
 - An aim is for students to persuade yet it is not clear in the outcomes and only appears explicitly in the A band of the achievement standards and not part of B or C.
 - The achievement standards should be much more descriptive e.g. sometimes, usually, always...
 - Unit 3 emphasises persuasive texts and this needs to be more explicit in the achievement standards. Point of view/persuasion generated a lot of discussion in relation to why persuasion only appears in the A grade. Writing persuasively should also appear in the B grade and possibly C grade.

English – Recommendations

- The achievement standards are the greatest concern in the draft document and need to be extensively rewritten.

English as an Additional Language or Dialect – Strengths

- See overall strengths for all English subjects.

English as an Additional Language or Dialect – Issues

- The management of Unit 4 will be problematic given that some jurisdictions spend three terms on Year 12 and others have four terms. Unit 4 may only be one term in length hence a comparability issue.
- There could be more analysis in Units 1 and 2 so that there is not such a large gap between the requirements of Units 1 and 2 and Units 3 and 4.
- The term 'modal nouns' generated a lot of discussion. Professional learning will be required around this for teachers in the NT in preparation for implementation.
- The difference between 'represented' and 'reflected' in texts is not clear in Unit 1 and this is not also clear in differentiating between the A and B grade bands in the achievement standards in dot point 3.
- Issues related to the achievement standards
 - The move from grade to grade is sometimes too big a jump and at other times too small.

- In the Unit 3 and 4 Achievement Standards there is a large discrepancy between grades. For example, responding to texts in the D grade requires description only whereas a C grade requires analysis and explanation. This is a large jump in the skills required.

English as an Additional Language or Dialect Recommendations

- Add analysis and evaluation to the Unit 1 description, as the achievement standards require these elements.
- The achievement standards are the greatest concern in the draft document and need to be extensively rewritten.

English as an Additional Language Bridging Units – Strengths

- It is positive that these units have been added. It will give this cohort of students an opportunity to engage with and succeed in senior secondary English. In particular, NT remote community schools can develop engaging and relevant courses using these units. It will also be pertinent for refugees and new arrival students who also need this type of learning to be recognised.
- There was agreement with the questions relating to the achievement standards for Units 1 and 2.

English as an Additional Language Bridging Units – Issues

- There was disagreement with the questions relating to the achievement standards for Units 3 and 4.

English as an Additional Language Bridging Units Recommendations

- The achievement standards for Units 3 and 4 need to be redeveloped.

3.2 MATHEMATICS

Key strengths identified by all mathematics subject groups

- Each subject contains prescriptive statements, which is seen as positive because it gives clarity about what students must know.
- The organization of the four subjects into four units each over two years is beneficial. This allows students to move at semester end, if necessary.

Key issues identified by all mathematics subject groups

- The degree of use of technology in teaching the subject will drastically affect the focus, assessment and outcomes for students.
- There is a lack of exemplars for A, B, C, and D performance.

- There needs to be a clear link between Year 10 Australian Curriculum mathematics and senior secondary mathematics subjects.
- The Cross-curriculum priorities of Aboriginal and Torres Strait Islander Histories and Cultures as well as Asia and Australia's engagement with Asia are not appropriately represented.
- In the achievement standards the comparative terms do not show a logical progression.

Overall Recommendations

- That there is a natural progression in achievement standards from Year 10 to senior secondary.
- That ACARA address the achievement standards to choose better comparative terms and ensure the terminology makes sense.
- That ACARA adjust the comparative terms in the achievement standards so that there is a logical progression from E grade through to A grade.
- That ACARA provide A, B, C, D and E grade performance exemplars.
- That ACARA provide examples of how teachers would place topic specific questions in contexts.
- That ACARA gives clarity about the order in which topics and units can be taught - across states.
- That the Cross-curriculum priorities of Aboriginal and Torres Strait Islander Histories and Cultures as well as Asia and Australia's engagement with Asia need not be represented in Mathematics subjects.
- Australian students would benefit from a subject with topic options, for example, SACE Mathematical Applications. We recommend that ACARA incorporate options into these subjects.
- That ACARA give clarity about when and how students can move between subjects.
- That ACARA take steps to ensure that local (state or territory) subjects be accredited at the same level as Australian Curriculum subjects.

Specialist Mathematics – Strengths

- The subject is content driven and more specific than the NT's current subject (SACE Specialist Mathematics).
- It includes content which is useful for students to know.
- The subject is aimed at the needs of a particular cohort.
- The glossary is comprehensive and gives teachers a better idea of what is expected content wise and in terms of complexity.

Specialist Mathematics – Issues

- The links between this subject and Australian Curriculum Mathematical Methods need to be clear.
- The subject was seen as too long (it would need seventy-five to eighty hours per Unit, not fifty or sixty hours), too hard, and very few students could do it. Units 1 to 3 each contain one topic too many. Three topics per semester is more appropriate than four.

- There appears to be more calculation and less analysis in this subject compared to SACE Specialist Mathematics.
- It is unclear what practical applications are expected.
- The complexity level is unclear as is the integration of topics such as trigonometry, complex number, recursive formulae and polynomials.
- In Unit 4 it is suggested that the Statistics topic needs to be taught first. The link in this topic with normal and binomial distribution is not clear. The statistical inference for continuous data is not clear.
- Some of the capabilities do not fit well with this subject and/or they need better examples.
- Every year the percentage of students, across the NT, who are adequately prepared for the SACE Specialist Mathematics subject is decreasing. This subject, as it is, is much more demanding. The numbers of students prepared for this subject will be very low.

Specialist Mathematics – Recommendations

- That ACARA indicate the links between this subject and AC Mathematical Methods.
- That ACARA decrease content in this subject. Take one topic from each of Units 1 to 3. This would assist in making it more achievable for students.
- That ACARA indicate what practical applications are expected in this subject.
- That, in Unit 4, the Statistics topic to be taught first.
- That ACARA provide clarity of the link in the Statistics topic with normal and binomial distribution and the statistical inference for continuous data.
- That ACARA provide better examples of how the capabilities can be addressed in this subject.

Mathematical Methods – Strengths

- The subject is aimed at the needs of a particular cohort and at preparing them for University.
- The Year 10 Australian Curriculum prepares students well for this subject.
- The achievement standards are clear.
- The glossary is comprehensive and gives teachers a better idea of what is expected content wise and in terms of complexity.
- This subject has rigor and logical development.

Mathematical Methods – Issues

- This subject has a higher cognitive demand than the analogous SACE Mathematical Studies subject and current successful students would struggle with it.
- This subject does not show a lot of opportunities for application.
- The group found that this was a very dry curriculum.
- The links between this subject and Australian Curriculum Specialist Mathematics need to be clear.
- There appears to be more calculation and less analysis in this subject compared to the analogous SACE Mathematical Studies subject.

- The topics Calculus 4 and Calculus 5 should be taught in a different sequence.
- Units 1 and 3 each contain more than sixty hour's worth of content and work. Clarity about the depth of treatment is required.
- Unit 2 contains many key ideas and so could be too long.
- Exponential functions (Calculus 3) and logarithmic functions (Calculus 2) should be dealt with together.
- The treatment of confidence intervals needs more depth.

Mathematical Methods – Recommendations

- That ACARA be aware that this subject has a higher cognitive demand than current Mathematical Studies (SACE) subject and current successful students would struggle with it.
- That ACARA indicate the links between this subject and Australian Curriculum Specialist Mathematics.
- That Topics Calculus 4 and Calculus 5 should be swapped. Calculus 4 should go to Unit 4 and Calculus 5 to Unit 3.
- That ACARA give clarity about the depth required in Units 1, 2 and 3. That ACARA place Exponential functions (Calculus 3) and Logarithmic functions (Calculus 2) together (in the same Topic).
- That ACARA specify the 95 per cent confidence interval.

General Mathematics – Strengths

- The subject is aimed at the needs of a particular cohort.
- Clearly expressed how capabilities fit within the subject.
- This could be a very relevant and useful subject for the more general mathematics students, which is a large percentage of the total NT cohort.
- There appears to be more calculation and less analysis in this subject which was considered appropriate to the intended cohort.

General Mathematics – Issues

- The subject was seen as too long.
- Algebra is too difficult for the intended cohort.
- No shares or profit and loss is a disadvantage – students benefit from their inclusion in a general mathematics subject.
- The glossary will need another layer below what is there, giving more detail as to the depth required.
- The Year 10 Australian Curriculum doesn't appear to prepare students for Matrices/Networks.
- The description of the Matrices and Graphs (Unit 1) section is unclear.
- The wording of the outcomes in Unit 2 is clumsy.

- It is considered that the 'Statistics Investigation Process' in Unit 2 should highlight the survey methods.
- More than sixty hours will be required for Unit 3 if a lot of modeling and 'within the framework of the statistical processes' is required.
- Leslie Matrix is not in the glossary (Unit 3).
- Statistics 2: Associations in Unit 3 will be difficult to teach in less than sixty hours due to the large amount of content.
- In the content descriptions for Unit 4 the inclusion of effective rates and changing the compounding period in the Topic Financial Mathematics 2 would be appropriate.
- In the achievement standards greater differentiation between the levels is required. For example, in Unit 1 and 2 there is only a one-word change to distinguish A from B from C etc. For example, 'most' to 'many' to 'some'. In units 3 and 4, the reasoning communication standard 5 is the same for both A and B.
- The achievement standards (for Unit 1) could incorporate an outcome related to the appropriate use of technology.
- The level of difficulty between Units 1, 2, 3 and 4 is substantial which could affect student progression.
- Some of the capabilities do not fit well with this subject and/or they need better examples.

General Mathematics – Recommendations

- That ACARA consider a decrease in content for this subject.
- That the level of Algebra required in this subject be lowered so as to better address the needs and ability of the intended cohort of students.
- That shares and profit and loss be included as (or within) topics in this subject.
- That another layer of detail is included in the glossary.
- That a clearer description of the Matrices and Graphs in Unit 1 section be included in the subject outline.
- That the achievement standards for Unit 1 incorporate an outcome related to the appropriate use of technology.
- That the wording of the outcomes in Unit 2 be adjusted to ensure clarity.
- That the survey method of random sampling be highlighted in the Statistics Investigation Process in Unit 2.
- That there be some indication of the degree of modeling required in Unit 3, and adjustments made so that the content covered is still manageable in sixty hours maximum.
- That Leslie Matrices be included in the glossary.
- That consideration is given to including effective rates and changing the compounding period in Unit 4.
- That the achievement standards for Units 3 and 4 be adjusted so that reasoning communication standard 5 is not the same for both A and B.
- That better examples of each of the capabilities be provided.

Essential Mathematics

Essential Mathematics – Strengths

- The suggestion of using context is good.
- The focus on more calculation and less analysis is appropriate for the intended student cohort. This needs to be reflected in the achievement standards.
- The group agreed that the general capabilities are appropriately represented.

Essential Mathematics Issues

- This subject has too much content.
- There needs to be more focus on making this subject relevant to the students via context.
- It appears that the intended cohort of students for Essential Mathematics has not been identified. 80 per cent of students currently taking a lower-level subject could not complete Units 1, 2, 3 and 4.
- This subject does not cater for the needs of the lowest group of students. Unit 1 goes into Algebra, basic operations and manipulation of formulae when the focus should be on basic numeracy. It seems to be geared for students progressing to University. Should there be a subject for students not intending to progress to University?
- The gradation of difficulty is inconsistent within the units and across some topics.
- There is a strong emphasis on literacy and using mathematical language. The appropriateness of this for lower level students is questioned.
- There is a wide range of student ability at this level. Units of work containing optional topics could be the answer to addressing this.
- Unit 2 contains content that is much more difficult than Unit 1. For example, Standard Deviation, Mean and Median, and Outliers.
- The comparative terms, used in the achievement standards, are vague. For example; standard, routine, non-routine, familiar. At times the terminology of the achievement standards is indecipherable. Whilst the achievement standards reflect the content described, they are densely worded containing multiple decisions for each separate standard and so make the task of analysing assessment complex, confusing and imprecise.
- Unit 3 has more content than other units and is much more difficult than Units 1 or 2.
- In Unit 3, Topic 1: Measurement there is a misuse of terminology and notation (see below).
- Unit 4 is more difficult than Unit 3 and will take more than sixty hours to cover.
- The subject does not address the needs/wants of the current generation.

Essential Mathematics – Recommendations

- That ACARA decrease the content of this subject and/or specifically design a subject to address the needs of the lowest group of students. There needs to be a subject for students who do not intend to progress to University.

- That ACARA ensure the gradation of difficulty is consistent within each unit and across all topics.
- That ACARA lessen the focus on literacy and using mathematical language.
- That Unit 1 commence with a focus on the basics.
- That, if Algebra must be included in this subject, it should be addressed in the context of Measurement and not be called Algebra.
- That ACARA look at the strategy of having one compulsory topic per unit and a choice of two or three topics from a list of optional topics. The subject needs to be more flexible.
- That Unit 3 be decreased in size.
- That Unit 3 Topic 3 be labeled as Linear Graphs, since it has no reference to Statistics.
- That the misuse of terminology and notation in Unit 3 Topic 1 Area measure be addressed:
 - Dot point 3 – instead of **regular** we suggest *geometrical*
 - Dot point 4 – instead of **regular** and **irregular** suggest *geometrical* and *compound*
 - Dot point 5 – omit all solids other than prisms
 - Dot point 6 – omit
 - Dot point 7 – instead of **irregular** suggest *compound* or omit dot point altogether
- That the misuse of terminology and notation in Unit 3 topic 1 Volume and capacity be addressed:
 - Dot point 2 – incorrect formatting of units e.g. 1 cm³ not 1cm³
 - Dot point 3 – omit
 - Dot point 4 – instead of **regular** suggest *prisms* and *cylinders*
 - Dot point 5 – omit
- That Unit 4 is decreased in difficulty and in length.
- That the subjects be designed to address student interests by approaching each topic from a contextual problem base. This will take more time and lots of scaffolding. This could involve combining topics or varying their order.
- That the achievement standards reflect the greater focus on calculation as opposed to analysis.

3.3 SCIENCE

Key strengths identified by all science subject groups

- In all subjects there was clear evidence of response to previous feedback, so all four units were considered to be much improved.
- The inclusion of Science as a Human Endeavour, with good examples will promote the inclusion of this strand in classroom teaching.
- Generally the sequence of units and the progression in cognitive skills from Unit 1 to Unit 4 was seen as logical.
- All subjects now offer opportunity for the inclusion of local contexts.

Key issues identified by all science subject groups

- Generally the achievement standards were seen as poorly developed, not showing a clear articulation of the differences between grades, difficult to apply to tasks and inconsistent across the four subjects.

Biology – Strengths

- There are clear links between this Senior Secondary curriculum and the relevant F-10 curriculum.
- This draft represents a considerable improvement on the previous draft, many of the issues raised have been addressed.
- The Cross-curriculum priority of Sustainability comes through strongly.
- Having a common Australian Curriculum is still seen as a worthwhile goal.
- This draft gives teachers greater opportunity to include local contexts.
- There is encouragement and support for fieldwork.
- There are some good examples of the integration of Science as Human Endeavour and Science Understanding, e.g. pages 11 and 17.

Biology – Issues

- Unit 1 is still seen as cognitively less demanding than Unit 2.
- In the Top End of the NT it is most likely that Unit 1, Biodiversity, would be done in Semester 2, for reasons related to our climate. This would mean our students could be starting Year 11 with Unit 2, which is a very high level. This different order of completing the units would also have implications for assessment and/or for students moving interstate.
- This curriculum makes it less easy for students to move in, or out, of Biology. The two-year commitment still exists.
- In response to the previous draft we stated, ...“the course seemed to be aimed at the ‘elite’ students...who are NOT the majority of our students”. This is still a major concern. The “core” science subjects should be accessible by the *majority* of students.
- There would also remain the issue of students having a short Term 4 in Year 11 and 12, which would make it extremely unlikely that the second unit in each year could be completed. This would require NT schools to consider starting the students Biology subject in Term 4 of the previous year.
- Unit 3 is the most demanding and has too much content specified, once the Science as a Human Endeavour strand is included.
- Achievement standards were seen as poorly developed. With states and territories being responsible for their own assessment the purpose of the achievement standards was questioned.
- The achievement standards have some fit with the Concepts and Learning Outcomes but not so clearly to the content descriptions. Presumably the content descriptions will form the basis for examinable content so teachers may end up asking what they are teaching to, the Concepts, the Learning Outcomes or the Content descriptions?

- Unit 4 is improved but still seems to be a bit of a mixture.
- The glossary seems unnecessary, with some definitions being incorrect, obvious terms being defined and many terms left out. It is unclear what the purpose the glossary serves.
- Given the emphasis on *field and research* investigations (Unit 1), and *field, laboratory and research* investigations (Unit 4) there is too much content. These investigations are extremely valuable but they take up a lot of class time.
- The level of statistical analysis has not been specified at any level.

Biology - Recommendations

- That there is a progression in the development of the Science Inquiry Skills particularly in Year 11. In the Biodiversity Unit students would need to *follow procedures to carry out field investigations*, while they could more reasonably be expected to *attempt to design and carry out such investigations* by the end of Year 12.
- Teachers would need support from experts in the design and carrying out of fieldwork, few teachers have the necessary expertise in this area.
- Remove the topic “immunology” from Unit 4 as it does not seem to be coherent with the rest of the unit.

Chemistry – Strengths

- There are clear links between this senior secondary curriculum and the relevant F-10 Curriculum
- It is good to have green Chemistry included and the Science as a Human Endeavour strand.
- The sequence of units is logical.
- The “for examples” are very helpful.
- There are ample opportunities for local contexts.
- The content descriptors, Unit descriptions and the Learning Outcomes are very clear.

Chemistry Issues

- Unit 1 still has too much content and it would be a real challenge for students just coming in to Year 11. The inclusion of the mole concept makes this topic too big and the required depth of treatment of this topic is not clear. Unit 1 should make specific mention of chemical equations.
- Unit 2 is also too big. It is not clear why this unit requires students to design and carry out field investigations as opposed to laboratory investigations.
- The achievement standards for Units 1 and 2 do not show consistent gradation between levels, and they do not clearly articulate the differences between the grades. It is difficult to see how assessment tasks could be designed to fit the achievement standards.

- It is disappointing that organic chemistry does not appear until Units 3 and 4 and the lack of biochemistry anywhere is a significant omission. Biochemistry supports many Science as a Human Endeavour concepts.
- Overall the Curriculum still seems to be “old” chemistry apart from the green chemistry and mention of nanotechnology.
- There is practically no requirement for titrations in Units 1 and 2, so students will need to learn these skills quickly in Units 3 and 4 and use them with a high level of skill with no previous experience.
- Having included Science as a Human Endeavour in the Curriculum there should be a reduction in the Science Understanding required, but this is not apparent.
- In the Learning Outcomes for Unit 4 (last dot point) it is not clear why there is such an emphasis on *secondary* data. If students have access to primary data would this not serve the same purpose?

Chemistry – Recommendations

- Would like to see included in Aims, dot point 4, ...”including manipulative skills required for practical chemistry”. For example, students need to become competent in titration for example so they can carry out the experiments required at Year 12 level.
- Balance up Units 1 and 2 which have too much content and perhaps move some of this to Units 3 and 4 which are “lighter” by comparison.
- Start over again with the achievement standards. Make it clear what their purpose is, and make sure they fit the content descriptions.

Earth and Environmental Science – Strengths

- The subject is accessible and would appeal to students especially those with high literacy and maybe lower numeracy skills.
- Specific examples, where given, are very helpful. Some of the more general ones are not so useful. For example, Unit 1 page 5, dot point 2 under “*Science as a Human Endeavour*” and page 6 dot point 2 under “*Science as a Human Endeavour*”.
- The conceptualisation of the four units is much better; there is a clear theme in each one.
- There is a much better mix of biology and geology than in the previous draft.
- There is ample opportunity for focus on local contexts.

Earth and Environmental Science – Issues

- The cognitive demands of Units 3 and 4 do not appear to be significantly greater than those for Units 1 and 2.
- Scope and depth in Unit 1 is not sufficiently defined. It is important that the depth required in Unit 1 is specified so the content in Unit 3 can be successfully taught.
- Under the heading “Organisation, 3. Structure of Earth and environmental Science” reference is made to “the earth system model”. This needs explanation so there is a consistent understanding across jurisdictions.
- Some explanation of Learning Outcome dot point 5 (page 17) would be helpful.

- Generally the achievement standards are seen as unworkable and set too high.
- The lack of consistency in the standards across the four different science subjects is a concern.
- Apart from having some definitions, which are questionable, it is difficult to see what purpose the glossary fulfills.

Earth and Environmental Science – Recommendations

- Include ideas/examples of practical's and/or fieldwork.
- The Science inquiry Skills in Earth and Environmental Science are significantly different from those in other sciences, in particular they have much more emphasis on secondary resources and require techniques that students will not have used before. Therefore it may be better to place the emphasis on acquiring these skills and learning procedures in Units 1 and 2 while students could progress to *designing* their own experiments in Units 3 and 4.
- Fieldwork is specified in every unit. This is fine but it would be very helpful to have an idea of the depth and number of these that would be expected

Physics – Strengths

- Good to see modern physics included.
- Logical progression through the four units.
- The mathematical representations are clear; they help define what is needed.

Physics – Issues

- The starting level is too high and all units have too much content.
- The subject seems to be aimed at the 'elite', mathematically minded students and will exclude those who might have an interest, but are less able.
- Teaching the Science as a Human Endeavour skills adds significantly to the time required to teach the units.
- There is significant mathematical content to be taught in addition to the significant physics content.
- In Unit 2 "Science Understandings", "Wave Model of Light", dot point 5 is a big idea and would fit better with Unit 4, despite this unit already having too much content.
- Unit 3 has too much content. The electromagnetic Induction content is interesting and should be included but not to the depth indicated. Motor design in particular should be removed.
- Too much content in Unit 4, and the mathematics involved is very difficult. This would disadvantage those students who presently have success at this level but who are not excellent mathematicians.
- Applications are not featured strongly enough.

- Teachers may spend too much time on the old models, when it is not necessary to study these in any great depth for the purposes of understanding the development of models for Science as a Human Endeavour.
- New equipment will be needed in the NT for practical experiments for Unit 4 and the electromagnetic Induction experiments. This is quite expensive demonstration equipment and in some instances will be used to demonstrate for very small numbers of students.
- Unit 4 will require professional learning for teachers to develop new resources and programs.
- Achievement standards are set too high. The descriptor for a 'D' grade describes a competent student who should achieve a "pass". In the Inquiry Skills even the 'E' describes a competent student.

Physics Recommendations

- Reduce content, especially in Units 3 and 4.
- Place more emphasis on applications.
- Re-write the achievement standards.

3.4 HISTORY

Ancient History - Strengths

- Considerable flexibility
- Appropriate increase in complexity from Unit 1 and 2 to Units 3 and 4
- Rationale is positive.

Ancient History – Issues

- Positivity of rationale is not necessarily reflected in all units of the curriculum, particularly Unit 1.
- Promise of ***rationale*** is not delivered in regards to:
 - *'Extends from the development of early human communities'*. The nature of Unit 1 is an examination of archaeology and the preservation of relics, which could equally apply to pre-historic communities. Thus, the inclusion of an Australian indigenous elective would allow students to engage with relics of human history in 'earliest communities'. Additionally such an elective would address the Cross curricula priority of Aboriginal and Torres Strait Islanders histories and cultures. This elective would allow teachers and students to *'address sites of significance to Aboriginal and Torres Strait Islander people, and the preservation and conservation of those sites. Students [would] develop skills to engage with relevant issues, and the subject includes the ethical concerns associated with the treatment and display of physical and human remains'*. All of this is evident in the preamble, but is not referred to in the units; it appears to be a token representation of this idea. The NT offers much for our students in this regard and conversely has minimal access to museums with artefacts from Egypt, Rome or the conventional studies of ancient times.

- Examination of '*significant legacies that exist into the present*' of the Ancient World is insufficiently evident in the unit descriptors.
- Note that rationale promises '*detailed evaluation of the contribution of various sources*' but there is limited opportunity to examine literature from the past, which reveals many concepts of power and authority.
- The learning outcomes are at odds with unit descriptions.
- There is limited reference to Asia other than China. Inclusion of the Khmer, Indus etc. are all possible and desirable.
- There is limited reference to women, and what reference there is, is exemplified with a sense of 'other'.
- The achievement standards should more exactly represent Bloom's Taxonomy. Of particular note an 'A' heavily identifies 'explain'- a low level skill, rather than 'analyse', 'evaluate' and 'synthesise'. Learning outcomes are not always evident in the achievement standards.

Ancient History – Recommendations

- Include an Indigenous Australia elective in Topic 1.
- Integrate Unit 1 into Unit 2: Unit 1 should focus student attention on the 'glorious period'. As it stands, Unit 1 is not coherent, nor engaging. Content covered is considerably less than Unit 2.
- The curriculum should be reviewed with special reference to:
 - Addressing the disconnect between Unit Descriptions and Learning Outcome
 - The depiction and status accorded to women.
 - A qualitative evaluation as opposed to a quantitative evaluation of the electives needs to be actioned.
 - A consideration of the conceptual framework of the curriculum, as opposed to a chronological and content consideration.

Modern History

Modern History - Strengths

- Rationale and structure are solid.
- A natural flow on from Year 10 Australian Curriculum is evident.
- Intention of moving through stages of development of the modern world is apparent.
- The focus on change and continuity is valued.
- There is choice with good opportunities to develop a coherent two year course.
- The unit descriptions clearly describe the focus and scope for the units, the outcomes clearly describe the expected learning and they contain relevant and appropriate knowledge.
- The use of lists in Unit 3 essentially mandates an Asian element.

- The General capabilities and Cross-curriculum priorities that naturally fit with this subject are appropriately represented.
- The glossary is comprehensive.

Modern History – Issues

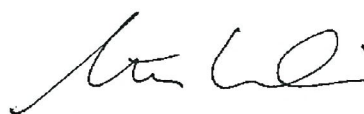
- Achievement standards for all units are dense making interpretation difficult for teachers and students. The descriptors are vague and there is little distinction between grades.
- Some, but not all historical concepts are mentioned by name in the achievement standards. Cause and Effect and Empathy are not evident in the achievement standards. There should be consistency.
- The title 'Historical knowledge and understanding' is inappropriate as historical 'analysis', 'assess' and 'evaluate' are skills.
- 'Empathy' is not identified as a historical concept in the F-10 Australian curriculum history, but appears in Units 1, 2, 3 and 4. There should be consistency.
- There is too much content to teach in fifty to sixty hours. For example, in Unit 3 there are large time frames providing a large content scope that is too much to cover. Unit 4 contains large topics, which will not be possible to address given the truncated nature of Year 12.
- There should be content descriptions on developing the Australian Identity at senior level.
- An additional unit and topic specific glossary may be useful.
- In Unit 4, 'Interpretations and representations' of events was seen as valuable, but needs more specificity to define the scope of the study.

Modern History – Recommendations

- Teachers should be encouraged to select units that show some connection otherwise students may get a very fragmented view of history. A brief overview, as in the F-10 history curriculum may have a role to play in 'tying it all together'.
- Amount of content needs to be reviewed in some topics.
- Achievement standards need to be reviewed to be made more workable.



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